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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,019	12/07/2001	Francesco Pessolano	NL 000667	8972
24737	7590	07/20/2004	EXAMINER	
PHILIPS INTELLECTUAL PROPERTY & STANDARDS P.O. BOX 3001 BRIARCLIFF MANOR, NY 10510			BUEHL, BRETT J	
			ART UNIT	PAPER NUMBER
			2183	

DATE MAILED: 07/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,019	PESSOLANO ET AL.	
	Examiner	Art Unit	
	Brett J Buehl	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/07/01, 2/25/02, 5/10/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 1-15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/07/01 & 5/10/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-15 have been examined.

Papers Submitted

2. It is hereby acknowledged that the following papers have been received and placed on record in the file: IDS as received on 05/10/02, Declaration and Fees as received on 02/25/02, Preliminary Amendment as received on 12/07/01, IDS as received on 12/07/01 and Foreign Priority Papers as received on 12/07/01.
3. It is noted that changes were made to the IDS as received on 12/07/01. The changes involved the reference patent AC, which was properly referenced in the specification but listed incorrectly on the IDS. The patent number, date, name, class, subclass and filing date were changed to the corresponding information for U.S. Patent No. 5,655,090.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
4. The applicant is requested to review the specification and update the status of all co-pending applications made mention of, replacing attorney docket numbers with current U.S. application or patent numbers when appropriate. References to U.S. applications or patents should make it clear as to what the number refers (e.g. U.S. Patent No. #), instead of listing only the number.

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to for the following reasons:

- a. The abstract contains legal phraseology (e.g. "said" in line 4) pointed out in the above paragraph as being improper.
- b. The abstract contains reference numerals 10, 12 and 14. The mentioned numerals have an unclear meaning in the abstract and should be removed.

Correction is required. See MPEP § 608.01(b).

7. The title of the invention is objected to for not being descriptive. The current title recites only a general term in the art and does not help to further identify the invention. A new title is required that is clearly indicative of the invention to which the claims are directed.

8. The use of the trademarks PHILIPS, R.E.A.L., SUN and MAJC has been noted in this application. Each trademark should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference character(s) mentioned in the description: Fig. 1, Fig. 2, Fig. 7 and Fig. 8. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

10. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "4" has been used to designate both a processing element and an execution element. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required

corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

11. Claim 15 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim can only refer to preceding claims in the alternative. The claim indicated recites the limitation, "at least any one of the claims 9 to 14." Taken to mean more than one, this claim would not have proper alternative form. See MPEP § 608.01(n).

It is noted that the Preliminary Amendment, filed on 12/07/2001, stated that claims 4-9 and 13-15 were amended. However, no amended claim 15 appeared in the document. For this reason, and for the purpose of this office action, claim 15 will be interpreted to depend solely from claim 10.

12. Claims 1-15 are objected to for containing reference numerals 6, 10, 12 and 14. It is unclear as to what the reference numerals refer. Please remove the numerals from the claims.

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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14. Claims 4, 7, 11, 13 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. Claims 11, 13 and 15 recite the limitation, "Method according to", in the first line of each claim. There is insufficient antecedent basis for this limitation in the claims. Each claim depends from an apparatus claim, none of which claim any method steps. The claims will be interpreted as reciting the limitation "Apparatus according to" for the purpose of this office action.

16. Claim 4 recites the limitation, "said register file is extended with said FIFO registers". The term "extended" has an unclear meaning in the given context. For the purposes of this office action, the limitation will be interpreted to mean the presence of both FIFO registers and a register file in the current apparatus.

17. Claim 7 recites the limitation, "which apparatus is adapted to execute a pipeline". It is unclear to the examiner as to what is meant by the apparatus executing a pipeline. Common terminology in the art states that a pipeline is an apparatus that executes an instruction. For the purposes of this office action, the claim will be interpreted as reciting the limitation "which apparatus is adapted to form a pipeline."

Claim Rejections - 35 USC § 102

18. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

19. Claims 1-7, 9-13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by

Kranich et al., U.S. Patent No. 6,574,725.

20. Regarding claim 1, Kranich has taught a digital signal processing apparatus for executing a plurality of operations, comprising:

a. A plurality of functional units (14A & 14B of Fig. 3A) wherein each functional unit is adapted to execute operations,

b. Control means for controlling said functional units, characterized in that said control means comprises a plurality of control units (300, 320A & 320B of Fig. 3A) wherein at least one control unit (300 of Fig. 3A) is operatively associated to any functional unit, respectively, for controlling its function, and each functional unit is adapted to execute operations in an autonomous manner under control by the control unit associated thereto (see col. 2, lines 20-23). The ability of the device cited in the reference to process multiple threads in parallel indicates the ability for the functional units to operate autonomously.

20. Regarding claim 2, Kranich has taught an apparatus according to claim 1, characterized by FIFO (first-in/first-out) register means (310A of Fig. 3A) adapted for supporting data-flow communication among said functional units.

21. Regarding claim 3, Kranich has taught an apparatus for executing a plurality of operations, comprising:

- a. A plurality of functional units (12A & 12B of Fig. 3A) wherein each functional unit is adapted to execute operations,
 - b. Control means for controlling said functional units (300 of Fig. 3A), characterized by FIFO register means (310A & B of Fig. 3A) adapted for supporting data-flow communication among said functional units.
22. Regarding claim 4, Kranich has taught an apparatus according to claim 2, comprising a register file (30A & B of Fig. 4) characterized in that said register file is extended with said FIFO means (310A & B of Fig. 3A).
23. Regarding claim 5, Kranich has taught an apparatus according to claim 2, characterized in that said FIFO register means comprises a plurality of FIFO registers (310A & B of Fig. 3A).
24. Regarding claim 6, Kranich has taught an apparatus according to claim 1, characterized in that each of said functional units are provided with at least one control unit (300, 320A & B of Fig. 3A).
25. Regarding claim 7, Kranich has taught an apparatus according to claim 1, which apparatus is adapted to execute a pipeline consisting of a plurality of stages, wherein each stage is executed by a functional unit (col. 8, lines 6-11). The mention of flushing the instruction pipeline after an incorrect branch prediction implies the presence of a pipeline in the reference apparatus (see Fig. 1).
26. Regarding claim 9, Kranich has taught an apparatus according to claim 1, further comprising a program memory means (20 of Fig. 2) storing a main program, characterized in that said main program contains directives for instructing said control units. It is noted that the

directives are interpreted as being program instructions, which, by definition, are decoded by the control units to control the functional units in a digital signal processor.

27. Regarding claim 10, Kranich has taught a method for processing digital signals in a digital signal processing apparatus, comprising a plurality of functional units (12A & 12B of Fig. 3A) wherein each functional unit is adapted to execute operations, characterized in that said functional units are controlled by a plurality of control units (300, 320A & B of Fig. 3A) wherein at least one control unit is operatively associated to any functional unit (300 of Fig. 3A), respectively, so that each functional unit is able to execute operations in an autonomous manner under control by the control unit associated thereto (see col. 2, lines 20-23). The ability of the device cited in the reference to process multiple threads in parallel indicates the ability for the functional units to operate autonomously.

28. Regarding claim 11, Kranich has taught an apparatus according to claim 9, characterized in that data-flow communication among said functional units is supported by FIFO register means (310A & B of Fig. 3A).

29. Regarding claim 12, Kranich has taught a method for processing digital signals in a digital signal processing apparatus, comprising a plurality of functional units (12A & B of Fig. 3A) wherein each functional unit is adapted to execute operations, characterized in that data-flow communication among said functional units is supported by FIFO register means (310A & B of Fig. 3A).

30. Regarding claim 13, Kranich has taught an apparatus according to claim 11, wherein a pipeline consisting of a plurality of stages is provided, and each stage is executed by a functional unit (see Fig. 1).

31. Regarding claim 15, Kranich has taught an apparatus according to claim 10, wherein a main program is stored in a program memory means (20 of Fig. 2), characterized in that said main program contains directives for instructing said control units. It is noted that the directives are interpreted as being program instructions, which, by definition, are decoded by the control units to control the functional units in a digital signal processor.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kranich et al., U.S. Patent No. 6,574,725, as applied to claims 1 and 10 above, and further in view of Laurenti et al., U.S. Patent No. 6,658,578.

34. Regarding claim 8, Kranich has taught an apparatus according to claim 1, characterized in that for each control unit an instruction register is provided (22A-C of Fig. 1), but has not explicitly taught a counter, wherein said counter indicates the number of times an instruction stored in said instruction register has to be executed by the corresponding functional unit.

35. However, Laurenti has taught the use of a counter register by the control unit to control the number of times the functional unit executes a repeat instruction (paragraphs 410 & 411).

The purpose of providing such a counter register is to reduce the number of instructions required to loop an instruction. By providing means for controlling the loop through use of a counter register, it is possible for a given instruction to loop with no additional instructions (e.g. without branch instructions). With fewer instructions to execute, the number of memory accesses would decrease. Decreasing the number of instructions needed for a program results in greater instruction set efficiency for the processor on which the instruction set is running. Increased instruction set efficiency means higher processor performance. It also results in lower power consumption since memory accesses require greater amounts of power.

The parallel processor of Kranich was designed with similar goals in mind. It has the capability of executing several instructions at the same time, in parallel. The parallel nature of the processor depends heavily on the efficiency of the instruction set which it is designed to execute. A more efficient instruction set means better performance for the parallel processor. It would have been obvious to someone of ordinary skill in the art at the time of the invention to modify the processor of Kranich to include a counter register since all of the benefits listed previously are the ultimate goal in the design of a processor and would lead to even greater improvements on processor performance.

36. Regarding claim 14, Kranich has taught a method according to claim 10, but has not explicitly taught it characterized in that the number of times an instruction stored has to be executed by a functional unit is counted by the corresponding control unit.

37. However, Laurenti has taught the use of a counter register by the control unit to control the number of times the functional unit executes a repeat instruction (paragraphs 410 & 411).

The purpose of providing such a counter register is to reduce the number of instructions required

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to operate a loop. By providing means for controlling the loop through use of a register, it is possible for a given instruction to loop with no additional instructions. This would reduce the number of memory accesses, thus reducing the power consumption of the device. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine the parallel processing capabilities of a DSP with a counter register to improve the efficiency of a given instruction set, thereby improving processor performance.

Conclusion

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is reminded that in amending in response to a rejection of claims, the patentable novelty must be clearly shown in view of the state of the art disclosed by the references cited and the objections made. Applicant must also show how the amendments avoid such references and objections. See 37 CFR 1.111(c).

39. Inquiries concerning this communication or earlier communications from the examiner should be directed to Brett J. Buehl who can be reached at (703) 305-4663. The examiner can normally be reached between the hours 8:00am – 5:30pm (EST), Monday - Friday.

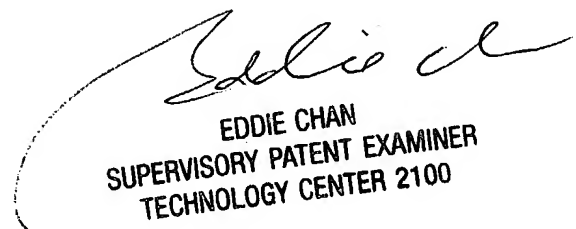
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan, can be reached at (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

40. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brett J. Buehl
Patent Examiner
Art Unit 2183



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